General Summary of January 11, 2016 Meeting and Other Conversations between DEC and EPA

Technical: DEC has asked EPA for additional comments and clarification of EPA's responses to the 5-29-15 Comment Response document. DEC provided extensive responses to EPA's comments provided in December 2014, January 2015, and March 2015. DEC has requested that EPA provide a list of major/minor issues with potential course(s) of action that could lead to EPA approval.

Process: EPA has expressed an unwillingness to put additional resources into this project if DEC is not willing to act on EPA's technical concerns (e.g., Use of the WER v. BLM). EPA has made it clear that additional sampling and testing could be required which would cause a significant delay in the project schedule.

The crux of the problem is the classic "dueling experts" scenario in which the applicant (PacRim) contends that the methods used to conduct testing, analysis, and application of results for the purposes of developing SSC are both technically and legally sound. EPA contends that the results are not valid for both technical (representativeness) and science policy (application of BLM rather than WER) reasons.

EPA Response: *EPA and DEC held a call on June 29, 2015, which included PacRim/its consultants and EPA HQ, to discuss EPA's three sets of comments and DEC's May response to those comments. Maja, Brock, and Bill also had a subsequent discussion on the comments and identified areas of likely agreement, and EPA and DEC have had subsequent discussions on the comments and responses (e.g., during the quarterly calls and monthly manager calls). During those discussions, EPA indicated that we were not able to provide further specificity on actions that would lead to EPA approval (other than generally identifying the need for potential additional data collection and analysis) until we elevated the issue and confirmed that DEC was interested in making any additional changes to the draft SSC. The main reason being that EPA had already provided substantial technical comments to DEC on a draft and had received feedback indicating that DEC did not agree with most of EPA's comments. Therefore, as DEC recognizes in the above notes, the degree to which EPA is willing to commit resources to developing detailed courses of action depends, in part, on ADEC acknowledging a need and willingness to address EPA's concerns. EPA is willing to work with DEC to develop a summary of the issues for tracking purposes.*

Regarding the parenthetical "Use of the WER v. BLM" as an example of an EPA technical concern, EPA's comments do not state a requirement to use the BLM rather than the WER approach for copper, and EPA has stated repeatedly and consistently that either approach can be used for copper (recognizing that there is not currently an EPA recommended BLM approach for aluminum or zinc). While EPA does believe that a BLM has benefits over the WER approach, EPA used the copper BLM to evaluate the State's WER values as an independent check and to demonstrate the significance of EPA's technical concerns The central point is that regardless of the method used to develop SSC, the SSC must be protective of aquatic life throughout the temporal and spatial range of conditions present at the site to which they will be applied.

EPA does not necessarily agree that this is a "dueling expert" scenario because ADEC has not provided a technical analysis in response to our comments related to representativeness and technical defensibility of the WERs. As EPA commented and subsequently explained to ADEC during conference calls, the SSC must be protective of the range of conditions found at the site. For example, ADEC has not addressed EPA's comment regarding the range of DOC concentrations estimated for the site and the effect of lower DOC concentrations than those reported for the three WER samples on copper bioavailability. DOC was

not addressed in the documents ADEC references as providing evidence that location 141 sufficiently represents the range of conditions present at the site. Instead, the response to most of these EPA comments has been that ADEC followed EPA's WER guidance. As we have discussed, the state must also be able to address EPA's technical concerns when applying the guidance in a specific situation based on the available, scientifically sound data.

Representativeness

Appears that there are two distinctly different issues

- Where you sample
- When you sample

EPA Response: *Criteria must be protective for the temporal and spatial range of conditions found at the site. Therefore, it may not be helpful to separate these issues.*

1. (Spatial) Does 141 have enough data to represent the entire project area?

- DEC has spent a lot of time and energy arguing this point but it may not necessarily be the crux of the representativeness issue. Might be a better argument for keeping the range of potential sampling locations limited to those in the Middle Creek drainage.

EPA Response: *Presuming "enough data" is referring to the three WER rounds using samples from location 141, EPA has commented that the three WER rounds using samples from location 141 do not appear to be adequate to develop criteria that would be protective throughout the site. For example, see EPA's 12/12/2014 comments regarding DOC at the site, under "Representiveness of sampling for calculation of the proposed WER-based SSC for copper for the Chuitna basin". Criteria must be protective for the full range of temporal and spatial conditions found at the site, and if the more sensitive conditions are not captured by the samples used to generate the WERs, the WERs are not protective for those conditions. EPA illustrated that the WERs at location 141 did not capture the more sensitive conditions relative to DOC.*

The extent to which additional sampling locations beyond location 141 on Middle Creek would be needed to capture the more sensitive conditions would require further consideration, including a close review of the historical water quality data available for the site and consideration of potential future conditions.

2. (Temporal) Does the three WER samples taken over two months represent the range of conditions that the WER needs to account for

EPA Response: *EPA has commented that the* three WER samples taken over two months do not appear to represent the more sensitive conditions regarding metals bioavailability (see above response under Spatial).

3. (Chemical-concentration) Does the WER represent the entire range of influencing factors (e.g., pH, temp, DOC) that could contribute to the toxicity of specific metals

- PacRim says the WER only considers a limited number of factors/EPA says that you need to consider a broader range based on NEW science (i.e. BLM)

EPA Response: *In a conversation Maja had with Brock, and in other conversations with DEC, EPA has explained that the WER will respond to the factors that are accounted for by the copper BLM, with particular reference to DOC, since that is the factor that has the greatest influence on copper bioavailability. A lower DOC level in surface water can be expected to result in a lower copper WER. Maja also indicated that DOC was not specifically addressed in most of the documentation ADEC provided regarding the representativeness of location 141.*

Copper Specific Comments

- Range of data doesn't necessary account for DOC (NOTE: DOC isn't part of WER so it wasn't included in sampling plan) so you can't determine whether the critical condition is documented

  EPA's Response: *The samples used for the WERs were analyzed for DOC, as well as TOC, and as EPA has explained, the results of toxicity tests/WER analysis for copper are expected to be influenced by the DOC concentrations in the samples tested; the parenthetical note above is not correct. EPA applied the DOC/TOC ratio from the WER samples to the TOC data for the rest of the site to estimate the DOC levels and evaluate the range of DOC found at the site. See EPA's comment 2 (p. 5 of DEC's response document). ADEC has not responded to the technical content of this comment.*

- DEC Response: DOC may be an element for further consideration based on new science (BLM) but stating that the WER isn't representative because it doesn't factor WER is not reasonable.
  - Mixing science protocols- easier to simply say that EPA does not think the WER is valid due to limited number of samples rather than what the samples considered

  EPA Response: *As explained earlier, DOC is a factor that affects the WER. This is clearly recognized in the WER study plan (page 18, Appendix A of the Tetra Tech 3/12/2010 WER report). The importance of DOC is also recognized in Appendix A of DEC's 7/25/2014 draft SSC decision document; however, DEC did not provide an analysis of the DOC concentrations reported for the three site-water samples used in WER determinations relative to the range of DOC concentrations that may be present at the site. EPA is not mixing protocols, but using available tools to evaluate the protectiveness of the SSC. We have discussed this with ADEC previously.*

- Potential Solution: Need additional documentation that notes why the three samples used for the WER are representative of the range of conditions (temporal) rather than range of sites (spatial).
  - Develop a rationalization for why each of the samples used for the WER is representative of the project on a temporal level?

  EPA Response: *EPA recommends that ADEC consider the full range of conditions found at the site, and evaluate the protectiveness of the WERs with respect to this range of conditions. EPA completed this type of analysis for DOC and found that the WER samples did not capture the lower DOC values and the WERs are, therefore, not likely to be protective for copper. A similar analysis was not attempted for other factors that affect metals bioavailability.*

Aluminum Specific Comments

- There appears to be a range (2.68 – 22.0) of WER results that cannot be accounted for (EPA 12-12-14)
- EPA notes in comments (03-25-15) that a WER of 2.68 could be applied since that was the lowest recorded value- but would still need additional clarification/justification
- Additional testing of a larger number of sample locations is requested- essentially you can't rely upon three samples to characterize the area at large
- PacRim contends that this is natural variability and the results were expected given the slightly acidic properties of site and lab water.

EPA response: *EPA's concern about the large degree of variability in the three individual WERs determined for aluminum has not been addressed, and whether the variability is natural, method variability, or a combination of both. There is little basis for determining that a geometric mean of the three individual WERs would represent a protective final WER. Similarly, EPA's comment of 3/25/2015 was intended to clarify that, because of the variability and uncertainty, the individual aluminum WER of 2.68 should not be used as a final WER simply because it is the lowest of the three WERs determined for aluminum.*

Zinc Specific Comments

- There was some discussion about use of a BLM calculator but since one has yet to be endorsed by EPA, this may not be the best approach
- Zinc has the lowest degree of WER variability and the overarching issues with temporal representativeness are of more concern

EPA Response: *Please see EPA's Dec. 12, 2014 comment regarding zinc. The existing data do not appear to support a SSC that is higher than Alaska's existing state-wide zinc criterion. ADEC's responses have not addressed this comment.*

WER v. BLM

Representativeness and use of WER/BLM are often overlapping- makes discussion confusing.

EPA Response: *The same factors that affect the magnitude of a WER are modeled by the BLM. The underlying chemistry and toxicity are the same; the procedures for quantifying the effects are different. For most situations, the factors that increase a WER will also generate a higher BLM-based criterion.*

- EPA says that it is using a technical argument for invalidating the WER results while DEC is using a process argument for supporting its application in SSC development
    - EPA contends that the WER results are invalidated when compared with BLM results-
    - Comes down to how dissolved organic carbon (DOC) is accounted for since WER doesn't consider it while BLM does

EPA Response: *Please see the response above. The statement that the WER doesn't "consider" DOC is incorrect. Lower DOC levels are expected to result in a lower WER, particularly for copper. EPA has commented that the three WERs that have been determined for copper do not appear to be adequate because, in part, DOC effects metals bioavailability/toxicity and EPA has estimated that DOC at the site is frequently lower than the DOC reported for the three samples used in WER determinations (46% of the time based on estimates that used the measured historic site water quality data for TOC). EPA used the copper BLM to demonstrate the significance of the lower DOC values.*

- EPA says that use of three rounds of WER testing cannot be representative of the area at large but use of the BLM and ALL available data may be acceptable
    - PacRim ran the BLM using data from Middle Creek but not Lone, Bass, or Chuit River
- EPA says that there are issues with the PacRim BLM analysis conducted on S141 data but we have nothing in writing explaining what those are
    - PacRim had Windward Env. Review the BLM test so it will be interesting to hear EPA's response since Windward developed the model for EPA (again-dueling experts)
    - EPA has some initial comments to share with DEC but it is not known if those comments reflect R10 and HQ concerns.

EPA Response*: EPA has provided preliminary verbal information to ADEC regarding basic concerns related to the data that were used to complete the recent BLM comparison, but EPA has not finalized its review. The comparison may be useful if it is completed correctly.*

Groundwater and Mine Effluent

DEC prepared an addendum to the SSC proposal that would add a "trigger" based on DOC concentrations. Failure to meet minimum DOC concentrations would result in WET testing and potentially result in more stringent criteria until minimum values were met.

- EPA did not review the addendum which was sent ~three months ago
- DEC resent the language for consideration prior to 1-26 meeting.
- EPA acknowledged that such an approach could be considered and will get comments back to DEC but no timeline was provided

EPA Response: *EPA appreciates DEC's recognition of the importance of considering future conditions when establishing SSC for the site and apologizes for not having already reviewed/commented on this proposal. EPA would like to further discuss this issue with ADEC and develop a timeline once we have an agreement from the 1/26 Directors meeting on how the overall project will move forward.*